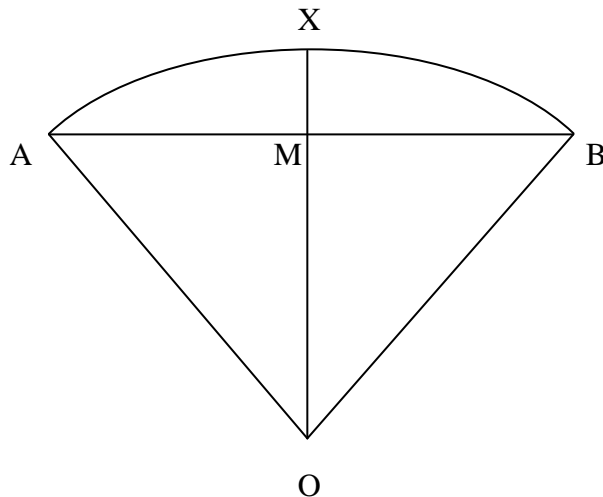


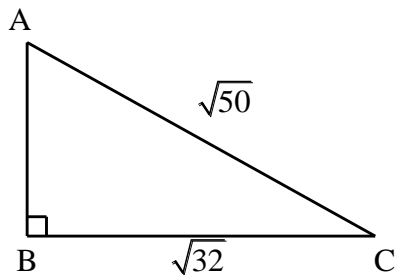
National 5

Homework RE11

1. AXB is an arc of a circle. $XM = 14\text{cm}$ and the radius $OB = 85\text{cm}$. Calculate the length of AB.

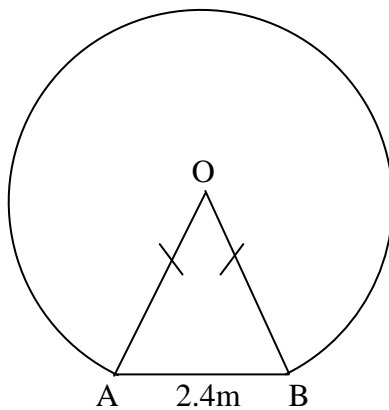


2. A right-angled triangle has dimensions as shown.



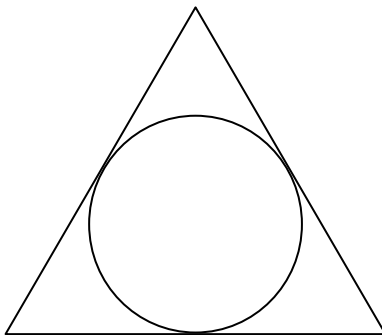
Calculate the length of AB, leaving your answer as a surd in its simplest form.

3. The diagram shows the circular cross-section of a tunnel with a horizontal floor. The circle has radius 2.5 metres and the floor has width 2.4 metres. Calculate the height of the tunnel.



4. (a) Solve $\frac{x}{3} = \frac{(1-x)}{5}$ (b) Express $\frac{4(2y-3)}{4y^2-9}$ in its simplest form.
5. Factorise:
- (a) $4a^2 - 9b^2$ (b) $2x^2 - 6x$ (c) $12x^2 - 17x + 6$

6. The diagram below shows a circle inscribed in an equilateral triangle.
The radius of the circle is 8cm.
Calculate the perimeter of the triangle.



7. (a) A cylindrical paperweight of radius 3 cm and height 4 cm is filled with sand.
Calculate the volume of sand in the paperweight.
- (b) Another paperweight, in the shape of a hemisphere, is also filled with sand.
It contains the same volume as the first paperweight.
Calculate the radius of the hemisphere.
- [Volume of hemisphere of radius r is $V = \frac{2}{3}\pi r^3$].
8. In a local election there were 3925 votes cast for the 3 candidates. The winner's majority over the second-placed candidate was 1031 and the winner had 3 times as many votes as the third candidate.
How many votes did each candidate receive?
9. Sketch the graph of each of these quadratic functions. Your sketches should show the points of intersection with the coordinate axes and the coordinates of the turning point.
- (a) $y = x^2 - 8x + 12$ (b) $y = 6x - x^2$
10. Write down the equation of the axis of symmetry of each parabola in Q9.
11. (a) Given that $x^2 - 10x + 29 = (x - a)^2 + b$, find the values of a and b .
(b) Hence sketch the graph of $y = x^2 - 10x + 29$.
12. Solve these simultaneous linear equations.
- (a) $3x + 2y = 8$
 $4x - y = 7$
- (b) $6a - 5b = 23$
 $7a + 4b = 17$
- (c) $7x + 5y = -15$
 $-2x + 3y = -9$
- (d) $x + \frac{1}{2}y = 2$
 $3x + y = 5$
13. Formula: $Y = an + bn^2$.
Find the value of a and b , given that $Y = 1$ when $n = 1$ and $Y = -2$ when $n = 2$.